THE DIETETIC TREATMENT OF DIABETES

B. D. BASU

22400029227

Med
K33006

Forwarded for favor of review.

It is requested that a copy of the paper in which notice of this book appears may be kindly sent to—

THE MANAGER, PÂNINÎ OFFICE,
BHUVANEŚWARI AŚRAM,
Bahadurganj, Allahabad.

THE
DIETETIC TREATMENT OF DIABETES

BY

B. D. BASU

MAJOR, I.M.S. (RETIRED.)

Second Edition. Revised and enlarged.

PUBLISHED BY
THE PANINI OFFICE,
BHUVANESHVARI ASHRAM
40, Bahadurganj, Allahabad
1909

Price Re. 1-8-0.

All rights reserved.

Printed by Panchkory Mittra at the Indian Press, Allahabad.

31185850

WELLCOME INSTITUTE
LIBRARY
Coll. welMOmec
Call
No. WK

PREFACE TO THE SECOND EDITION.

The fact of the longevity of cases of diabetes in India was brought to prominence in the discussion of the subject at the annual meeting of the British Medical Association last year (1908). There must be some reason for this longevity. It is hardly any explanation to say that acute cases of diabetes do not occur in India as they do in Europe or America. I attempted to account for the longevity of Indian diabetics in a paper which I wrote more than ten years ago. Extracts from this paper are given in this work, to which the particular attention of the profession is invited. I have tried to show that meat is not necessary in the dietary of diabetics, especially in India, where many communities are born vegetarians. Great stress is laid on the cocoanut cure. It is hoped that the following pages will be of use to the general medical practitioner as well as to those who have the misfortune of suffering from diabetes.

ALLAHABAD,
1st November, 1909.

B. D. BASU.

DIETETIC TREATMENT OF DIABETES MELLITUS.

Diabetes Mellitus is not a specific disease.

Diabetes Mellitus (that is, voiding a large amount of urine containing excessive quantities of sugar and nitrogen), is not a specific disease. Structural lesions of the pancreas, the liver or some portion of the nervous system,—have been known to be associated with this disorder. But how this is brought about is not clearly understood.*

---

* The following are the recent views regarding the origin of the sugar in diabetes :—

ORIGIN OF THE SUGAR EXCRETED IN PANCREATIC DIABETES.

As an exclusive proteid diet for dogs, codfish was chosen ; when boiled, it is free in winter and spring from glycogen and glucosides, and contain only traces of fat. Dogs without a pancreas so fed create in a month 30 per cent. of their body weight of sugar, or a weight greater than all the proteid of their body. The sugar must originate either from the fat or proteid of the body or of the food. In spite of the food, the body wastes "to a skeleton," only heart and brain remaining unaffected. The liver enlarges enormously to 5 per cent. of the body weight or five times more than in ordinary starvation ; it is normal in composition. In diabetics the liver is always richest in fat. There is no constant proportion between the sugar and nitrogen of the urine, and so the origin of sugar from proteid is doubted. The sugar is believed to originate in the liver cells, which are capable of turning fat as well as glycogen into sugar. The liver overgrows owing to the large amount of work it has to do in relation to proteid ingested ; its sugar-forming function is simultaneously increased. Any stimulus of the liver such as ammonium carbonate or neutral soaps increases the sugar formed.—Journal, Chemical Society, 1905, A. II. 469.

IRON IN THE DIABETIC URINE.

Neumann and Mayer have described four cases of diabetes in which there was a constant relation between the sugar and the iron in the urine. This is important in view of the possible origin of sugar from nucleic acid. Three cases are, however, now recorded in which the proportion varied from 1·7 to 3·4 mg. iron per 100 grams of sugar.—J., C. S. 1905, A. II. 469.

Had we known the true pathology of Diabetes Mellitus, we should have been perhaps in a position to treat it more properly than we can at present.

Mild and severe forms of Diabetes Mellitus.

It is with the present-day physicians customary to divide cases of Diabetes Mellitus into (1) the mild and (2) the severe forms.

By chemical examination of the urine as suggested by Gerhardt,* and test diet such as that of Von Noorden,† attempts have been made to distinguish the mild from the severe forms of the disease. The dietetic treatment is made to differ in these two classes. In the severe form it is said that a rigid anti-diabetic diet is not necessary. For my own part, I do not consider rigid diet necessary even for mild cases of diabetes. It is

---

* Gerhardt's test consists in the testing of the suspected urine with a solution of perchloride of iron; if diacetic acid is present, then a claret coloration is produced, the intensity of which depends on the severity of the ease This reaction is also produced when salicylates, aspirin or antipyrin are voided by the urine. So these drugs should de discontinued before examining the urine to determine the form of diabetes.

† This is meant for the recognition and estimation of the assimilative capacity for carbo-hydrates. Von Noorden says :—

"Of all the foodstuffs, carbo-hydrates exert the greatest influence upon the glycosuria. It is essential in every case to determine the precise amount of carbo-hydrates which the patient can tolerate. We call this the *tolerating power* of the individual. * * * *

"I divide the foods into two groups :—

1. Principal articles of diet. These include substances which are practically free from carbo-hydrates. Foods and drinks of this group form the basis of the three meals a day.

2. Accessory articles of diet. These include substances which contain carbo-hydrates.

* * For the purpose of the test diet I always at first choose white bread, and of this I commence with 100 grammes per day, 50 grammes for breakfast and 50 grammes for lunch.

Von Noorden's standard test diet.

Breakfast.—200 grammes coffee or tea with one to two tablespoonfuls of thick cream.

100 grammes of hot or cold meat (weighed after cooking). Butter.

Two eggs, with bacon.

50 grammes of white bread.

Lunch.—Two eggs cooked as desired, but without flour; or any other *hors d'œuvre* free from flour.

Meat (boiled or roasted), fish, venison, or fowl, according to taste, about 200-250 grammes altogether (weighed when cooked).

Vegetables, such as spinach, cabbage, cauliflower, or asparagus; prepared with broth, butter or other fat, eggs or thick sour cream, but without any flour.

20 to 25 grammes creamy cheese; plenty of butter.

Two glasses of light wine or red wine, if desired.

One small cup of coffee, with one to two table-spoonfuls of thick cream.

50 grammes of white bread.

Dinner.—Clear meat soup, with egg or green vegetable in it.

One to two meat dishes, as at lunch.

Vegetable dishes, as at lunch.

Salad of lettuce, cucumber or tomatoes.

Wine.

No bread.

Drinks during the day (exclusive of wine), one to two bottles of ærated water.

this craze for rigid diet which is responsible for much harm in this disease, since the withdrawal of carbo-hydrates from foods produces what Von Noorden and his school call acid auto-intoxication. This leads to acetonuria, which, Hirschfeld has succeeded in demonstrating, is due to the removal of carbo-hydrates from the food. The presence of acetone in the blood is mainly responsible for the occurrence of diabetic coma.

Recent years have seen something like a revolution in the dietetic management of diabetic

---

"The total urine excreted during the twenty-four hours is collected, that of the day and of the night separately, and is examined quantitatively for sugar. Both the percentage contents, and more especially the whole quantity of sugar excreted in the twenty-four hours is noted.

"Further investigations as to the quantity of acetone, oxybutyric acid, ammonia, nitrogen, follow as a matter of course. If on this fare, the only carbo-hydrate contents of which are the 100 grammes of bread, no sugar is excreted, the quantity of bread is then gradually increased until sugar does appear in the urine. If, on the other hand, sugar is excreted with this test diet, the patient is at first kept on the same fare until the daily quantity of sugar excreted has become nearly constant. Then the quantity of bread is gradually diminished. * *

"When the urine becomes free from sugar whilst there is yet bread in the daily fare, it is with a case of the so-called *slight form of glycosuria* that we have to do, and the testing has taught us at the same time how high the tolerating power of the patient is. * * The greatest differences occur in this respect, and it is only an exact knowledge of them which patients. Not very many years ago, medical men, as a matter of routine practice, used to deprive their diabetic patients of all carbo-hydrate foods. This can be gathered from the long lists of articles of food which were allowed and of those which were forbidden to diabetics by such eminent medical men as Dr. Pavy, Sir William Roberts and others. As specimens, the lists prepared by the two above named physicians are reproduced below :—

PAVY'S.*

Sanctioned.	*Forbidden.*
Butchers' meat of inds except liver.	Sugar in any form.
Ham, bacon, and other preserved meats.	Wheaten bread and ordinary biscuits of all kinds.
Poultry and game.	Rice, arrowroot.
	Sago, tapioca.

---

enables us to properly prescribe the diet regulations necessary for each individual.

"When it appears from these test examinations that the urine only becomes free from sugar when bread is totally excluded from the dietary, we have then to do with the *severe form of glycosuria*" (pp. 174-177).

The object of the test diet is to show if the sugar comes from albumins. There is no need to subject Indian diabetics to this test diet, for not only many of them are born vegetarians and teetolers, and so would not partake the foods prescribed above, but acute cases of diabetes being rare in this country, most of them possess toleration for carbo-hydrates.

* "Food and Dietetics," 2nd edition, 1876.

Sanctioned.

Fish of all kinds, fresh and cured, including the crustacea.
Animal soups, beef-tea, and broth (not thickened).
Eggs, cheese, cream cheese, cream, butter.
Almond, bran or gluten substitutes for ordinary bread.
Greens, spinach.
Turnip-tops, watercress.
Mushroom, mustard-and-cress.
Cucumber, lettuce, endive.
Radishes, celery.
And the following only in moderate quantity, after boiling in much water:
Turnips, French beans.
Brussels sprouts, cabbage.
Cauliflower, broccoli, seakale.
Asparagus vegetable-marrow.
Pickles, olives, vinegar, oil.
Jelly, flavoured, but not sweetened.
Savoury jelly.
Blanc-mange, made with cream and not milk.
Custard, made without sugar.
Nuts of all kinds, except chestnuts.

Forbidden.

Macaroni, vermicelli.
Potatoes, carrots.
Parsnips.
Beet-root.
Peas.
Spanish onions.
Pastry and puddings of all kinds.
Fruits of all kinds, fresh and preserved.

Beverages.

Tea, coffee, cocoa from nibs.
Dry sherry, claret, hock.

Milk, except sparingly.
Sweet ales, mild and old porter and stout, cider.

Sanctioned.	*Forbidden.*
Dry Sauterne, Chablis, Burgundy.	All sweet and sparkling wines.
Brandy and spirits, unsweetened.	Port wine, unless sparingly.
Soda-water.	Liqueurs.
Burton bitter ale in moderate quantity.	

SIR WILLIAM ROBERTS.'

Butchers' meat.	All saccharine and farinaceous foods.
Poultry and game.	Bread, potatoes.
Fish.	Rice, tapioca, sago, arrowroot, macaroni, etc.
Cheese.	Turnips, carrots, parsnips, beans and peas.
Eggs.	Liver (contains much sugar-forming substances), and therefore
Butter, fat, and oil.	Oysters Cockles Mussels } Containing enormous livers.
Broths, soups, and jellies, made without meal or sugar.	The "pudding" of crabs and lobsters.
Cabbage, endive, spinach.	*All sweet fruits*, as apples, pears, plums, gooseberries, currants, grapes, oranges, etc.
Broccoli, Brussels sprouts.	
Lettuce, spring onions.	
Watercress, mustard-and-cress.	
Celery.	
Substitutes for bread.	
Bran-cake, gluten bread (and meal), almond meal, rusks and biscuits.	
"Torrified" or charred bread.	

Beverages

Dry sherry, claret, bitter ale.	Port and all sweet wines.
Brandy and whisky (in small quantities).	Sweet ales and porter.
Tea, coffee (no sugar), chocolate (made with gluten meal), soda-watar, bi-tartrate of potash water.	Rum and sweetened gin.

Rice and potato which were altogether banned from the dietary of the diabetic are now made by several practitioners the bases of their treatment of this disease. The argument for the withdrawal of carbo-hydrates from the diet was a very simple one. As the urine contains sugar, so it was thought, the exclusion of those articles from diet which are converted into sugar in the system, would lead to the cure of the disease. Preponderance of proteids—especially animal flesh—entered into the dietary of diabetics. But this did not cure those cases.* Extended experience has proved the harmfulness of the reckless administration of flesh foods to diabetics.

---

* Thus Sir Thomas Lauder Brunton says that he has found raw meat of great use in the *Treatment of Diabetes* but has never succeeded in curing a case with it. He writes :—

"It seemed probable that the glycosuria in many cases of diabetes might depend upon the non-conversion of glucose into lactic acid, and it occurred to me that possibly, either by giving raw meat or a glycerine extract of it, I might be able to cure the disease. In a paper published in the *British Medical Journal* of February 21, 1874, I mentioned the result of this treatment in some cases in which I tried it at St. Bartholomew's Hospital. In none of them was a cure effected but in some of them there was temporary benefit. These cases were, I believe, the first in which portions of a solid organ were administered for the purpose of supplying a ferment which would alter tissue change. Before that time only ferments obtained from the digestive canal had been used in medicine. " * * Encouraged by the success which attends this method of treatment by thyroid or other glands, I have again been trying raw meat in diabetes. The results which I have obtained are much the same as before. I find distinct amelioration of the symptoms, but I cannot say that I have yet succeeded in curing a case." Brunton's Disorders of Assimilation, pp. 9, 10.

Fats and oils in diabetes.

Diabetics, as a rule, suffer from sub-normal temperature, and when they have fever, then their urine is generally free from, or contains a very small amount of, sugar. Fats and oils have been proposed as substitutes for carbo-hydrates in feeding the diabetic.

The food which a healthy person takes in the course of 24 hours represents between 2,500 and 3,000 calories; but the diabetic requires more since he voids large quantities of urine containing sugar. One gram of sugar representing about 4 calories, a loss of 300 grams a day means that 1,200 calories have to be replaced. It is calculated that one gram of proteid represents about 4 calories, whereas the same amount of fat about 9. So the diabetic losing 300 grams of sugar a day by his urine has to take extra 300 grams of proteid or 135 grams of fat to cover his loss. Fatty foods should, therefore, be given by preference.

When the liver is affected, that is when diabetes is due to liver disorder, food which does not undergo secondary digestion in that organ should be given. Fats, therefore, are so very useful in diabetes, since the liver is not unduly taxed for their digestion.

Fats are, no doubt, our "sheet-anchor" in the dietetic treatment of cases of diabetes. But fats cannot be given in very large quantities, or rather, in isodynamic quantities as substitutes for carbo-hydrates. Moreover, it has been found that ingestion of certain kinds of fats often leads to acetonuria.

Acetonuria how produced.

"Gelmuyden was the first to call attention to this relation for he demonstrated that the ingestion of butter led to an increased excretion of acetone. This author assumed that the acetonuria in this instance was due to the effect of free fatty acids, and Waldvogel, Hagenburg, Schwarz, Mohr and Lob and others could also determine that the ingestion of free fatty acids, as for instance, butyric acid, led to an increased elimination of acetone in the urine and in the expired air. The same effect, however, is also exercised by the neutral fats, although not to such a degree."*

How the deprivation of carbo-hydrates produces acetonuria is not as yet fully understood, although the above-named authors have attempted the following explanation, when they say:—

"The phenomenon of acetonuria with its many modifications becomes quite comprehensible if we assume that acetone is a synthetic product derived from certain bodies that contain few carbon atoms and that may be derived from different sources.

"Normally the fragments of the proteid and fat molecules that contain few carbon atoms undergo further oxidation but only as has been repeatedly emphasized if a sufficient quantity of carbo-hydrates is present. This is probably due to the fact that the carbo-hydrates contain so much oxygen. A portion of this oxygen is presumably liberated when the carbo-hydrates undergo metabolism and is used for the oxidation processes. That the effect of the oxygen must be of a peculiar kind is demonstrated by the fact that there is no lack of respiratory oxygen in diabetes. One might imagine that the influence of the carbo-hydrates is a constant effect, exercised by the oxygen *in statu nascendi* that is liberated within the cell."*

---

* Acid Auto-intoxication, by Prof. S. Carl von Noorden and S. Mohr (1903), pp. 25 and 26.

The same authors write:—

"Some authors recommend adding carbo-hydrates or substances that are similar to carbo-hydrates to the diet, for in this way, it is argued, the acetonuria is decreased, while at the same time glycosuria is not greatly increased. A substance answering this purpose would seem to be levulose. Unfortunately, however, as Von Noorden has repeatedly shown, this sugar is useful only in mild cases, for in the more severe cases levulose seems to increase the glycosuria as much as other carbo-hydrates (amylum, etc.) In severe cases, on the other hand, levulose presumably exercises the same effect on the glycosuria as starch, and the latter substance is more useful because it offers more variety to the patient and is more agreeable to take than levulose. For these reasons we employ levulose in those cases in which we desire a very rapid result and in cases in which—as for instance in incipient coma—only a liquid diet can be given. Under these circumstances, levulose frequently exercises a very excellent effect and aids in warding off impending danger."

Vegetarian diet for diabetics.

In recent years, vegetarian diet (especially, carbo-hydrates) has found favour with a very lrage number of medical men. Flesh foods are not considered so absolutely necessary in feeding the diabetic, as they were formerly.

---

* Locum Cit., pp. 71-72.

Harmfulness of flesh foods in diabetes.

It is a fact that diabetic patients who are vegetarians live longer than those who are meat-eaters.*

In a paper on "Diabetes in India" written several years ago, I attempted to account for this by the fact that the kidneys are not so often disorganised amongst vegetarians as they are amongst meat-eaters. Extracts from this paper are given below :—

DIABETES IN INDIA.

"Almost every practitioner in India comes across cases of Diabetes Mellitus lasting for ten, fifteen and, in some instances, even twenty years.

Flesh foods disorganize kidneys.

"Whether we regard diabetes as a manifestation of some morbid condition of the liver, pancreas, or of some portion of the nervous system, it cannot be denied that the kidneys also share greatly in pathological changes in the course of this disease. Death in diabetes, if not brought about by some complications, such as pneumonia or phthisis, is almost always due to the kidneys not discharging their functions properly. The closing scenes in diabetes always point to the mischief in the renal apparatus.

---

* Diabetics require more potassium salts than healthy persons. Therefore they should be given vegetables rich in such salts.

"Robin (*Bull. de l' Acad. de Med.*; No. 23 of 1895) recommends the food to be well salted on account of the loss of inorganic salts in diabetes; to supply potassium salts he advises green vegetables, especially cabbage and endive, and also a weak solution of potassium tartarate to dilute the wine taken at meals; and to counteract the loss of phosphates of magnesium and calcium he prescribes glycero-phosphates of lime and magnesia. He also recommends bouillon on account of the inorganic salts which it contains." (B. M. J. Epitome, 10-8-1895, p. 23.)

"If we bear this fact in mind, we shall be able to understand the longevity of diabetic cases in India, and also to rationally treat the disease.

"In the first place, kidneys have not to perform so much work in India as in Europe and other cold countries. The chief function of kidneys is to remove impurities from the blood. In India, the skin largely shares in discharging this function and so the whole strain is not put on the kidneys.

"In the next place, kidney disease is not so common amongst Indians as amongst Europeans. This is due to Indians being accustomed to the vegetarian diet, which is non-stimulating and also to their eschewing alcoholic beverages. Alcohol-consumers have to pay the penalty in diseased kindneys.

Residual kidney power of Indians.

"The marvellous residual kidney power of the natives of India is the keynote of the longevity of cases of diabetes amongst them. They retain their kidney power unimpaired from their vegetarian diet and non-alcoholic drinks and also the fact that they keep the pores of their skin open by frequent baths.

" That the organic disease of the kidneys accompanied with albuminuria is set up in the course of diabetes has been very ably pointed out by Dr. Karl Grube in a paper read before the sixteenth Congress of Internal Medicine at Wiesbaden and published in the *British Medical Journal* for July 23, 1898. He has explained how the development of chronic nephritis in diabetic patients takes place.

Kidneys should not be unduly taxed.

" Not losing sight of the fact that in diabetics, kidneys are sooner or later diseased, our course of treatment should be such as not to throw undue strain on them. In the treatment of diabetes, the regulation of diet plays the most important part. With many practitioners, the administration of animal food is the chief treatment of diabetes. They believe that such food is not converted into sugar and thus the cure of diabetes is to be hoped for. The reckless prescription of animal food has been often followed by serious consequences. The writer has known practitioners giving animal food to diabetics who had never tasted flesh before. The patients instead of improving sank rapidly and died. It has not been proved that animal food checks the course of the disease. Such being the fact its use should not be insisted upon in the case of those who are not accustomed to it. Moreover, meat diet is not the proper thing for patients suffering from any renal disease. This diet throws undue strain on the kidneys, hence it should be very cautiously given to diabetics.

Why vegetable diet is beneficial in diabetes.

"From vegetable diet, on the other hand, much good is to be expected. It is non-stimulating and does not throw unnecessary strain on the kidneys. Of course, such vegetables as are rich in starch and sugar should be excluded.* In India where the people are chiefly vegetarians, diabetic patients should be prescribed vegetarian diet."

In diabetes, there are skin affections, as boils and carbuncles, brought about by the blood wanting in proper alkalinity. To make it properly alkaline, vegetable diet is of paramount importance. Vegetable salts keep the blood alkaline.

---

* We cannot, however, pass over the unique experience of Professor Pietro Lupo of Naples, who has reported, in the *Canadian Practitioner* for February 1898, cases of diabetes completely cured by exclusively vegetable diet. In the vegetable dietary he excluded nothing – all edible soups, peas, beans, saccharine fruits, including the grape. He says that after two months of the vegetable diet, the urine showed a complete absence of sugar. However, it is a safe rule in practice not to allow such vegetables to diabetics as are rich in sugar or sugar-forming elements.

Residents of Europe and America who are mostly meat-eaters, suffer from constipation and other ailments which are due to it. It is a well known fact that the thirst of the diabetic is increased by constipation. Vegetarian diet not only keeps the bowels regular and thus relieves constipation, but by its containing a large amount of water does not make one feel so thirsty as meat diet does. For the relief of the thirst and constipation of the diabetic, vegetarian diet is indicated.

All the above show the necessity and value of vegetables in the dietary of the diabetic.

Articles of food allowed to diabetics.

Formerly all kinds of meat (except sweetbread and liver), fish, poultry, game and eggs were considered good for diabetics. But shell-fish, containing a large amount of carbo-hydrates, were forbidden. Animal food, for reasons stated above, should be, as far as possible, withheld from the dietary of diabetics.* However those who are accustomed to it, may be allowed to partake of it in moderation. For them, fish especially will be found very useful. Bread made from fish roe may be also given with advantage. This is made from the roe of fresh water fish, being dried and ground and then cooked in the usual fashion.

---

* Professor Chittenden's experiments have shown the harmfulness of giving, even in health, large quantities of albuminous food-stuffs. In a disease like diabetes, where the general tone of the system is below par, the reckless administtraion of proteids—especially animal foods—cannot prove beneficial.

According to Von Noorden, " feeding with casein is associated with the most marked degree of glycosuria, then follow that resulting from the proteids of the leguminosae (peas, lentils, beans). Egg albumin and the albumin of cereals (wheat, rye, rice, oats) have the least power of producing glycosuria. In severe cases of diabetes one must bear this experience in mind, and absolutely forbid casein and also limit the quantity of meat that may be eaten." (Diabetes, p. 75).

Milk in diabetes.

Milk is very useful in diabetes ; so much so that there is the system known as milk cure of diabetes. In this system, which was much practised by Dr. Scott Donkin, the food is limited to *skimmed* milk. At first the patient takes four to six pints in 24 hours, gradually increasing it to 12 pints. Part of this milk is converted into curds and whey and taken as such. According to Dr. Donkin, by placing a patient on milk diet, sugar entirely disappeared from the urine at the end of a fortnight.*

---

* THE SKIM-MILK TREATMENT OF DIABETES.

" The skim-milk treatment of diabetes and Bright's disease was suggested by the late Dr. Arthur Scott Donkin in a book under this title published by Longmans, Green and Co. in 1871. He considered it suitable for all but the very worst cases. He administered it in the following manner : On the first day of treatment half a teacupful of skim-milk every two or three hours ; on

But this exclusive milk diet has not found favor with the medical profession generally.*

Milk contains four per cent. of sugar and a very large amount of water—which, it is said, make the condition of the diabetic worse. But, on the other hand, it contains a large quantity of fat and albumen which cannot but benefit diabetics. So cream may

---

the second day, double the quantity at the same intervals; on the third day, half a pint at intervals of three or four hours; on the fourth day, four pints may be given: on the fifth or sixth, five pints, and if borne well the quantity may be raised to six, seven, or even, in patients of large frame and keen appetites, to nine pints. In some cases he gave curds in addition. The milk may be given cold or warm: every other article of food must be strictly prohibited, although occasionally tea or coffee was allowed. The general experience of other authorities has not been favourable to this plan of treatment. The late Sir William Roberts said: "Three chronic cases I know of in which the treatment was obstinately persevered in died from exhaustion." Dr. W. H. Dickinson writes: "Of two diabetic women thus treated in St. George's, one died on the second day, possibly partly from the effects of the journey to the hospital; the other slowly sank under the process, and owed her death in all probability to it; with these experiences I have myself forborne the practice." The late Professor Frerich condemned it, and Dr. Ralfe spoke of it as only suited to the gouty type. Professor Saundby, in the first edition of his *Lectures on Diabetes*, printed a table to show that this diet is one on which patients may lose weight while the amount of sugar is not reduced. Finally, it is not in accordance with the modern principles upon which the treatment of diabetes is based; these recognise that each diabetic patient has an individual capacity for the assimilation of carbo-hydrate food, and that the problem which the physician has to solve is to determine this quantity for him and to construct a diet containing only as much carbo-hydrate as he can utilize.—*The British Medical Journal* for 12th November, 1904.

* "I consider milk to be counter-indicated at all periods of the disease and, like Frerichs, have always seen the sugar in the urine greatly augmented under its influence." (Germain Sec's Du Regime Alimentaire, p. 522.)

be given with great advantage to them. It contains less milk-sugar, and a large amount of fat.*

Curds of milk in which sugar has been partly converted into lactic acid are useful in diabetes. *Koumiss*, *kefir*, *laben* and those preparations of milk in which the sugar is got rid of by fermentation may be prescribed with advantage to diabetics.†

---

* "I reject milk entirely from the dietary of the diabetics. I have always seen in diabetics who have drunk milk the amount of sugar in their urine increased by it." (Dujardin—Beaumetz's L'Hygiene Alimentaire, p. 178.)

Notwithstanding the views expressed by the above-mentioned authorities milk should find an important place in the diabetic dietary. Dr. Haig writes of the case of a diabetic patient that "by increasing the milk I appeared to be able to ward off the coma. It has also been pointed out by Maurel (*Bull Gen. de Therapeutique*, 1897) that milk diet warns off both the gangrene and coma of diabetes." (Uric Acid, 6th Edition (1903), p. 678.)

Œttinger (*Sem. Med.* March 26th, 1897) treated patients with chronic myocarditis, albuminuria, generalised gout, dyspepsia, etc., with milk diet with great success, and concludes that milk is not so injurious as is supposed. It is far from certain that lactose generates glycosuria in all cases of diabetes, though it has been shown to do so in some. Bouchard has shown that all generators of glycogen do not have an equal action. There are carbo-hydrates that seem to have little influence on glycosuria, such as levulose, inulin, and mannite, which have often been used without ill-effect. It is, however, certain that the same carbo-hydrates produce different effects in different persons. Certainly the rule is that the group of sugars which deviate polarised ligth to the left are less injurious than those that deviate it to the right. Œttinger has shown that milk may be invaluable in some cases of diabetes, and that its prescription should depend, not on a general theory, but entirely on the individual case.

† *Koumiss substitute.*

To prepare a substitute for Koumiss from cows' milk, the *Ap. Zeitung* gives the following directions: Dissolve 15 grm. ($\frac{1}{2}$ oz) of grape sugar in 120 cubic centimeters (3 fl. oz.) of water. Mix 1·2 grm. (18 grain) of well washed and pressed beer yeast with 60 cubic centimeters (2 fl. oz.) of cows' milk. Mix the two liquids in a champagne bottle, fill with milk, stopper securely, and keep for three to four days at a temperature not exceeding 10°C (50°F), shaking frequently. The preparation does not keep longer than four or five days —[*Scientific American Cyclopedia of Receipts*].

However, experience has shown that milk is useful in diabetes. Milk-sugar is not so harmful as cane-sugar.

Artificial milk, from which sugar has been removed, has been suggested for diabetics.*

*** There are several methods of preparing artificial milk. According to Dr. R. T. Williamson :—**

" Four table spoonfuls of cream are added to a pint of water, and well mixed. The mixture is allowed to stand in a cool place. At the end of 12 hours the fat of the cream, which will have floated to the surface, can be skimmed off with a teaspoon. On examination this will be found to be practically free from milk-sugar, which will remain dissolved in the pint of water. The cream fat is skimmed off the surface of the water in the first vessel and then placed in another vessel, and to it are added water, the white of an egg, a little salt, and a trace of saccharin (if desired.) A palatable artificial milk can thus be prepared. This milk may be allowed freely in all forms of diabetes. (The egg albumen may be omitted, according to the patients' taste.)—The *Practitioner* for April 1906, pp. 494-495.

The Journal of the Society of Chemical Industry for 15th September, 1905, gives an account of English Patent 17,318 of August 16,1904, for the production of *Milk free from Sugar*. The cream is separated from the milk by centrifugal action and washed, the casein is precipitated by acetic acid, filtered off, washed and redissolved in dilute alkaline solution ; this casein solution is recombined with the separated cream and the necessary salts are added. These salts consist of a soluble calcium salt, such as calcium chloride, sodium chloride, and a soluble phosphate, such as sodium phosphate ; the desired sweetness is imparted by the addition of " crystallose," the sodium salt of methyl-saccharin. This sugar-free milk can be sterilised at 100°C. without coagulation.

A German Patent 202, 463, dated January 1st, 1908, taken by I. Bonma and S. B. Selhorst, for the preparation of milk free from sugar is described in the Journal of the Society of Chemical Industry for December 15th, 1908, page 1172.

" Milk is freed from fat by treatment in a centrifugal machine, the cream is washed with water till free from milk-sugar, and again treated in the centrifugal machine till of the same water content as at first. The skim-milk is treated with carbon dioxide under a pressure of 25-30 atmospheres to precipitate the casein, which is separated, washed, and dissolved in dilute sodium hydroxide solution. To the solution a saturated solution of monosodium phosphate is added until the mixture has an amphoteric reaction, and then, after addition of some sodium chloride and 'crystallose,' the liquid is mixed with the separated cream."

Use of fats in diabetes.

Fats, as said before, are our sheet anchor in the dietetic management of diabetes. These may be derived from the animal or the vegetable kingdom. Butter, cream, cheese, yolk of eggs, bone-marrow, vegetable oils, nuts and other oleaginous seeds may be very usefully given to diabetics. But it is necessary to remember that fats without the addition of carbo-hydrates may produce acetonuria. Regarding butter, the authors of the monograph on " the acid Auto-intoxication" say :—

"Butter gives the highest values for acetone excretion of all the fats that we eat. Von Noorden has called attention to the fact that this deleterious influence that large quantities of butter exercise can be reduced if thebutter is first thoroughly washed with cold water, for in this way the lower fatty acids are removed and they exercise the greatest influence on the acetonuria. If the butter is thoroughly washed, quantities as large as 180 or even 200 grm. can be given without causing any appreciable increase in the acetone excretion and we will hardly ever be tempted to give more fat than this"*

Clarified butter, known as *ghee*, can be given with more safety than butter.

In his monograph on Diabetes Mellitus, Noorden says :—

"The question as to whether fats also play a part in the formation of the sugar is a much more difficult one to answer. For the one component of fat—the *glycerin*—the question may be at once answered in the affirmative. * * * glycerin increases glycosuria both in severe cases of diabetes in man and in dogs after extirpation of the pancreas. *Lecithin*, which contains a fair amount of glycerin, behaves in the same way." (p. 7.5)

---

* L. C., pp. 73-74

Use of carbo-hydrates in diabetes.

As said before, the importance of carbo-hydrates is now recognised and they are not withdrawn from the dietary of diabetics as it was customary to do not very many years ago.* Several methods of diabetic cure by means of different carbo-hydrates are now practised. But before describing these different cures it is necessary to allude to the fact of there being a larger excretion of sugar in the morning hours than at any other time of the day. There is, at present, no satisfactory explanation of this phenomenon. Dr. Naunyer's explanation is "that in the empty intestines the introduced Carbo-hydrates more quickly digest and absorb, and so the diabetic organism is supplied with more sugar at once than it can assimilate." But

---

* Falkenstein (*Wien. Med. Presse* 1905) draws a parallel between gout and diabetes. According to him, in gout there is deficient secretion of gastric juice, so in diabetes pancreatic secretion is defective or absent. The cell in gout is unable to oxidize completely nitrogenous material ; in diabetes carbo-hydrate metabolism is at fault, the intermediate product of oxidation being not uric acid but sugar. If this is true abstention from carbo-hydrate food, though it may lower the percentage of sugar in the urine, withdraws from the body useful food without influencing the disease. Treatment should be directed in diabetes, not to the withdrawal of all possible forms of sugar in the food, but to sources remedying the deficient pancreatic digestion and stimulating the metabolism of the cell.

Dr. Haig contends against this, and says that sugar follows the uric acid, rising when it rises, and falling when it falls, and so there is a larger excretion of sugar in the morning hours when the excretion of uric acid is large. Be the explanation what it may, this phenomenon has an important bearing in regulating the diet in reference to time of day. Carbo-hydrates may be withheld, if possible, or given in very small quantities to diabetics during the morning hours.

In recent years, some articles of food, rich in carbo-hydrates, have been recommended by different medical men as specific cures for diabetes. These are known as (1) Oatmeal cure; (2) Potato cure and (3) Rice cure. These seem to be based on the principle enunciated by Von Noorden's school that "the most efficient means for combating acidosis in diabetes is the abundant administration of carbo-hydrates."*

Oatmeal cure.

(1) Oatmeal cure. The author of this is Von Noorden. It is carried out as follows:—

"The patient for one or two weeks eats nothing but oatmeal gruel daily, 250 grm. of oat flour, 250 to 300 grm. of butter, 100 grm. of Roborat or of some other vegetable albumen; this mixture is prepared as a soup and given at intervals of two hours. It is a remarkable fact that on this diet the excretion of sugar

---

* The acid auto-intoxication p. 74.

almost without exception falls below the quantity that was excreted on a mixed diet free from carbo-hydrates." (Ibid, pp. 74-75.)

Potato cure.

(2) Potato cure. Potatoes were, and still are, forbidden by many to the diabetic. Yet it is a remarkable fact that its use has been recommended by many in diabetes.*

---

* Sir Thomas Brunton writes :—

"In my opinion it is not advisable to remove carbo-hydrates entirely from the diet. If you do this you find the patients, as a rule, suffer very much, and that they practically get such a craving for carbo-hydrates that they will have them in spite of your prohibitions, whereas, if you allow them in a limited form you may get your patients to stick to the diet as you restrict it, and it is much better that they should take the diet which you have laid down for themselves. Diabetics, as a rule, complain very bitterly of their diet, and say that it becomes so distasteful to them. You may allow a little potato if it be given in the form of potato chips. A single potato cooked in this form may be made to fill almost a whole dish. It must be cooked, however, in one particular way, and this is the way. You must have a large deep pan, not a frying pan, but a pan six inches deep, and this should be nearly full of oil or grease; dripping is as good as any other kind of fat. You put this on the fire, and it comes as you think to the boil, but this boiling is quite delusive. You let it go on boiling, and all the water that is mixed with the dripping boils away, and finally in place of the apparently boiling liquid you get liquid with a perfectly smooth still surface, which is not boiling at all, and then is the time you are able to cook your potatoes. They should be cut in very thin shavings indeed, and should be then thrown into this practically boiling fat. When I say boiling I mean this very hot fat which does not appear to boil. They are then quickly taken out, and under the influence of the great heat they become firm and crisp upon the surface, and the fluid that they contain is boiled within these crisp surfaces by the heat, so that they are blown out, and each little shaving of potato, which was originally as thick as a bit of cardboard, is now about three-quarters of an inch thick. These potato chips may be used in cases of diabetes, and you will find that the patients are very fond of them as a rule, and they are enabled to get down a quantity of food that they could not otherwise take." [Brunton's *Disorders of Assimilation, &c.*, pp. 54-55.]

An editorial in the *British Medical Journal* for January 18, 1902, p. 160, states that the value of potatoes as a substitute for bread was recommended in small quantities by several authors, such as Dajardin-Beaumetz, Kuelz, Saundby, and others. But M. Mosse, in his communications to the French Academy of Medicine, goes still further in the use of potatoes in considerable quantity, as much as three pounds being allowed daily. He describes a number of cases which were placed on this diet, to show that, as compared with the equivalent quantity of bread, their use was followed by a decrease in the amount of the glycosuria, polyuria, and thirst; also marked improvement in general health. In only one case were the results unfavorable. It has been shown that diabetics can take 3,000 grains daily in the form of potatoes without eliminating more than 500 or 600 grains of glucose in the urine. Mosse ascribes the benefit of the potato diet to the alkaline salts, especially potassium, contained in the potato.

Sir James Sawyer, in his article on "Improvements in dietetics of diabetics" in the *British Medical Journal* for March 5, 1904, p. 537, states that the permission of potatoes in the food of diabetics is one of the greatest dietetic advances of our times. Cooked in any of the ordinary ways, they are a grateful food, but they should be cooked by steaming with the skin on. He proposes that the bread difficulty in diabetics be met by using the "flour" of properly cooked potatoes instead of the flour of grain.

He writes:—"I find that excellent and delicious baked cakes can be made from paste composed of a kind of flour prepared by rubbing down potatoes cooked with their coats on by steaming, blended with cream and butter." Then he gives the following details for the making of these new biscuits and bread for diabetics:—

"*Bran and Potato Bread.*—Take half a pound of flour of steamed potatoes, quarter of a pound of bran, half an ounce of German yeast, half an ounce of butter, one egg. Twenty-four hours before making the dough, cook the potatoes by steaming them in their "jackets," then peel and break up into flour with the fingers. Mix all ingredients together, and let the paste stand near the fire for an hour to "rise." Bake in greased tins for an hour and a half."

According to Futcher (Maryland Med. Journ. for October 1904) potato starch improves such other symptoms of diabetes as thirst, neuralgia, etc., and that it not uncommonly produces tolerance for carbo-hydrates. He recommends that potatoes should be given baked.

As potatoes contain only about a third as much starch as bread they may be given with proportionately greater freedom; this is a great economical advantage, enabling us to recommend those poor patients who cannot afford to buy gluten or other starchless breads or biscuits to content themselves with a baked potato as a substitute for bread.

Rice cure.

(3) Rice cure has also been recommended by Duering.

The Hindu physicians of Bengal use a preparation of rice with *ghee* and milk which they give to diabetics. This preparation is called in Bengali *choru.* I have seen and known cases of diabetes benefited by this food.*

Bread substitutes for diabetics.

Bread being also a carbo-hydrate was (and is) under the ban of many medical men. And so many substitutes for ordinary bread were recommended for diabetic patients. Dr. R. T. Williamson

---

*It is necessary to mention here that oatmeal and potato cures have not found favor with the majority of English physicians. Thus Dr. J. Rose Bradford writing on Diet in Diabetes in "A system of Diet and Diabetics" edited by Dr. G. A. Sutherland, says.—"Potatoes and oatmeal are very suitable kinds of carbo-hydrates to give in certain forms of diabetes, in as much as it is so usual to take them with large quantities of fat, either in the form of butter with potatoes, or cream with porridge. * * there is no reason for thinking that either potatoes or oatmeal contain carbo-hydrates that are less prejudicial to the diabetic than bread and other carbo-hydrate foods." (p. 450).

has classified the most useful of these bread substitutes as follows :—

> "1. Prepared from vegetable albumens :
>
> Roborat bread. Aleuronat cakes. Gluten bread.
>
> 2. Prepared from nuts :
>
> Almond cakes. Cocoa-nut cakes.
>
> 3. Prepared from milk albumens :
>
> Plasmon powder and biscuits. Protene bread and biscuits. Casoid bread and biscuits. (Kalari and pro-lacto biscuits.)"

Gluten bread was formerly very extensively used in the dietary of the diabetic. But it has fallen into disuse, because it is unpalatable, expensive and by no means free from starch. Bread made of almond flour, cocoanut flour, *besan* or flour of several varieties of *dâls*, which are not only palatable and inexpensive but contain less amount of carbo-hydrate than gluten, could be very advantageously used as substitutes for ordinary wheaten bread if so desired.

Speaking of bread it is necessary to remember what Dr. William Prout said in his work on the Nature and Treatment of Stomach and Renal diseases regarding the use of bread in diabetes. The present classification of food stuffs originated with Dr. Prout and in his time he was considered a great authority on all questions relating to Food and Diet in health and disease. He wrote :—

> "Bread, therefore, made with undressed flour, or even with an extra quantity of bran, is the best form in which farinaceous

and excremental matters can be usually taken in most of the varieties of dyspepsia, accompanied by obstinate constipation. This is a remedy, the efficacy of which has been long known and admitted; yet, strange to say, the generality of mankind choose to consult their taste rather than their reason; and by officiously separating what nature has beneficently combined, entail upon themselves much discomfort and misery."*

---

* "For some time past, I have recommended as a substitute for bread in diabetes, a compound of bran, eggs, and milk, which if properly prepared is not unpalatable. The late Rev. J. Rigg, to whom this *bran-bread* was recommended, took much pains to perfect the process, and the following, with some slight variations, is the method he finally adopted.

"The bran in the first place is to be reground, or the coarser portions separated by sifting. It is then to be diffused through cold water, and permitted to stand for a short time so as to allow all the heavier portions, and particularly the silicious mattter derived from the mill stones, to subside to the bottom. The bran suspended and diffused through the water, is now to be poured into a bag made of cloth, of such a texture as to allow the farinaceous matter, but not the bran, to escape through it; and the bag with its contents are to be repeatedly washed in cold water till the water is no longer rendered milky; in other words, till the whole of the farinaceous matter is removed. The bran is then to be removed from the bag, dried before the fire or in the sun, and after being well beaten and separated, again sifted; when it will be fit for use.

"Seven eggs, one-sixth of a pound of butter, the same quantity of suet, (previously melted together,) and a pint of milk are then to be well incorporated and mixed with as much of the prepared bran as will make a soft dough, which is to be well kneaded in the ordinary way. The quantity of dough thus prepared will make four or five small loaves or cakes, which may be baked in saucers in a quick oven.

"According to Mr. R. "This bread kept well and remained very palatable for a few days, and having it," he observed, "I really did not feel the want of any othe kind of bread.' He sent me a specimen, which arrived in good condition, and corresponded with his account. The addition of a few carraway seeds may by some be deemed an improvement. I regard this bran-bread as much superior to the *gluten*-bread recommended in Diabetes; all the specimens of which I have seen have been difficult of mastication, in short, almost as much so as caoutchouc. It is probable that a superior bread may be made by a due admixture of bran, prepared as above, with gluten; and that the lightness may be increased by employing the carbonate of soda and muriatic acid, as in the preparation of unfermented bread. In this case the milk may be omitted, and the bread made to resemble more nearly common bread."—Dr. Prout's Nature and treatment of Stomach and renal diseases, 5th Edition, 1847, pp. 43-44.

But it is not always necessary to make use of bread substitutes for diabetics. Most of them can and do tolerate ordinary wheaten bread better than its substitutes.*

The use of millet in diabetes

As substitutes for rice and wheat, different kinds of millet have been used in the dietary of diabetics. These are used in the form of porridge and of *chapatis*. There is a larger percentage of oil in millet than in wheat or rice. This perhaps accounts for its usefulness in diabetes.

Von Noorden says :—

The limitation of carbo-hydrate to one particular kind.

> " Whether it is the rice cure of Duering, the milk cure, the oat cure or the potato cure, on which we fix our attention, we find that underlying them all there is a common principle—namely, the limitation of carbohydrate to *one particular* kind, excluding all others, and at the same time the exclusion or the maximal reduction of

---

* Although bran contains a large percentage of nutritive ingredients it is for the most part indigestible and irritating to the alimentary canal. So attempts have been made to produce a digestible flour from it. In the Journal of the Society of Chemical Industry for Oct. 15, 1908, p. 994, there is a description of a process of which the author is T. Schluter, Jun. Foerderstedt, Germany. It has been patented in the United States, America; the patent bearing No. 897,854 and being dated September 1st, 1908.

" Bran is mixed with boiling water to a thin pulp, then heated quickly to a temperature of 100°C., dried at a temperature of about 70°C., and the solid mass obtained ground to a flour."

Bread made of bran flour prepared as above is very nutritious and may be given to diabetics with advantage.

meat. * * * * It is of tremendous importance to possess, as in the oat-cure, a means of mastering large quantities of acetone-bodies within a few days. Even though we may not be able to permanently maintain this favorable state of affairs, it is still of the greatest advantage to the whole organism to be given a period, of about a week or a fortnight, in which the issues are practically free from acetone."

Carbo-hydrates are essential to human life, and therefore these should not be withdrawn from the dietry of the diabetic. Truly has Dr. M. C. Ridwill of Melbourne University in his paper on "Rye bread in Diabetes" observed :—

"I would like to say here that we must not be carried away by the analyses of food stuffs given in books. The chemical means of analysis are not the digestive means, so that when we see a food marked as containing 70 per cent. of starch, we must not consider that the body ferments can extract the equivalent in glucose of 70 per cent. of starch."

According to Schultzen and other recent investigators sugar is eliminated unchanged in diabetes because the ferment is lacking which normally splits sugar into lactic acid and glyceric aldehyde. The withdrawal of carbo-hydrates and the administration of flesh foods will not generate the sugar-splitting ferment in the system.

The importance of carbo-hydrates being recognised, the question has arisen, which other carbo-hydrates besides the above could be given to the diabetic? Gautier answers this as follows: —

" We say: Supression of the saccharose or cane sugar and of glucose, but not of levulose, a special sugar which is not sensibly eliminated; reduction of starchy foods but not of those which Külz has pronounced harmless and which are rich in ordinary starch, but in inulin and inosit, special starchy sacharine substances which are unfitted to be changed directly into glucose. Such are Jerusalem artichokes, viper's grass, scorzonera, salsify, French beans, chicory, lettuce, cardoons, onions, leeks, many mushrooms, etc.

" As to asparagus, radish, cress, long radishes, turnips, horse-radish and especially the vegetables properly so-called: spinach, sorrel, cucumber, cole cabbage, cauliflower, sauerkraut, salads of every kind, these may be also taken, as they contain *but very few carbo-hydrates*. Moreover, cooking carries off from these vegetables a large proportion of their sugar and partly dissolves their starches, which disappears with the water."

" Fruits properly so-called, particularly those of the Rosacæ (peaches, apples, apricots, pears, strawberries, raspberries), containing as a rule only 5 to 6 parts of sugar and 1 to 7 of starch per 100, may in case of necessity be tolerated, *provided they are not taken in excess*, as 100 to 150 grms. per day do not introduce more sugar than 10 to 15 grms. of bread do. Moreover half of this sugar is in the form of levulose which rapidly disappears from the blood. The same may be said of the orange, lemon, pomegranate, etc."

" With still more reason may those fruits, which contain scarcely any sugar or starch, be sanctioned: almonds, nuts, olives. On the other hand, it is necessary to avoid those which are rich in sugar or starch: bananas, chestnuts, cherries, grapes, etc."

In India, besides the above, such fruits as *jambul, phalsa, lasora, papaya, Bael* (Ægle marmelos); Kath bael (Feronia Elephantum); Zizuphus vulgaris and jujuba; Averrhoa Carambola; Anacardium Occidentale; and Semecarpus anacardium may be given to the diabetic with advantage. The prune also is very beneficial to the diabetic, for it not only acts as a thirst quencher, but when properly dried and treated, contains more nourishment, volume for volume, than any other food.

Substitutes for sugar.

While there is difference of opinion regarding the prescription of starches to diabetics, most of the authorities are agreed that sugars—saccharose and glucose especially—should not be given to them. Diabetics crave for something to sweeten their foods and drinks with. Saccharin has been proposed to satisfy their craving. This is a coal-tar product and said to be 300 times sweeter than cane-sugar. But at the same time it is a poison. It may be used as a medicine, but not as a food.

Sucrol, a paraphenctol-carbamide, has been also proposed as a substitute for sugar, but this also cannot be given in large quantities as it gives rise to unpleasant symptoms.

Glycerine has been proposed as a substitute for sugar. But its administration also is known to increase glycosuria.

Levulose, erythrite and inosit may be used as substitutes for sugar. But these are very expensive stuffs. It must be admitted therefore that at present there is no cheap article which can be used by the diabetic as an efficient substitute for ordinary sugar.

The use of Inulin Biscuits.

Since diabetics can assimilate inuline—a form of starch found in tubers of several species of *Inula*, such as that of *Inula racemosa* which grows in the Western Himâlaya, on the borders of fields, &c., Kashmir, and Piti, it has been recommended to be given in the form of biscuits.

Kulz gives the following recipe for making these :—

> "Fifty grammes of inulin are to be put in a large porcelain basin, and while standing over a water-bath to be rubbed up with 30 cubic centimeters of milk, and as much hot water as may be necessary, into a uniform dough, with which the yolks of four eggs and a little salt are to be mixed. To this the whites of the four eggs are to be added, having first been beaten to a foam and carefully worked in. The dough is finally to be baked in tin moulds, previously smeared with butter. The taste of the biscuits may be improved by the addition of vanilla or other spices." ("Dietary of the Sick; Von Ziemssen's Handbook of General Therapeutics.")

Dr. Hale White suggests that the tubers may be cooked and eaten as a vegetable.

Diabetic Patent foods.

There are on the market many proprietary foods meant for diabetics. These are advertised as being free from starch and sugar. Thus Messrs. Callard and Co. of 74, Regent Street, London, say regarding their preparation of "Casoid Diabetic flour" as follows:—

> **This flour consists mostly of vegetable proteids, and is therefore a very highly concentrated nourishing food. It can be made into loaves by following the directions printed on every packet; 3 ozs. only are required to make a good loaf. It is also useful for making puddings, pastry, cakes, etc., according to the directions.**
>
> *Analysis of Casoid Flour.*
>
> **Water 10·80; Fat 1·40; Mineral Matter 2·50; Proteids 84·56; Cellular Fibre, etc. 0·74; Total 100·00.**

Diabetics require more fat than proteids. So most of these preparations are not suited to them. Besides they become stale after some time and as these are not manufactured in India, they cannot be used when fresh. For my own part, I do not consider it necessary to recommend any of the advertised proprietary foods to Indian diabetics. Moreover, both Hindus and Muhammadans may have religious scruples against their use.

The Cocoanut cure.

The cocoanut tree is the most useful plant that nature has bestowed upon mankind. There are at least a hundred uses to which the different products of this tree can be put. But without referring to its other economic uses, it is necessary to say that the fruit has not attracted that attention in the treatment of diabetes which its importance demands. The fruit is a perfect food and drink combined. The objections which can be raised against cures by oatmeal, potato, rice or some other carbo-hydrates cannot be urged against the cocoanut. It contains all the ingredients necessary to maintain man in health and comfort. In diabetes also it can be given with safety. The cocoanut water is a very pleasant beverage, beneficial to the diabetic as it assuages thirst, since it is about twenty-five degrees cooler than the atmosphere. In describing the liquid possibilities of the cocoanut tree, Sir Samuel W. Baker writes :—

> " As the stream issued from the rock in the wilderness, so the cocoanut tree yields a pure draught from a dry and barren land; cup of water to the temperate and thirsty traveller; cream from the pressed kernel ; refreshing and sparkling toddy to the early riser : arrack to the hardened spirit-drinker ; and a cup of oil, by the light of which I now extol its merits—five separate and distinct liquids from the same tree."

Cocoanut water and cocoanut oil are very useful in the treatment of diabetes.

The possibilities of cocoanut oil are also great. In these days when it is becoming very difficult to obtain pure and unadulterated *ghee*, refined cocoanut oil should be largely used in every household.

It is so very nourishing that some have even proposed it as a substitute for cod liver oil in the treatment of tuberculosis. The importance of cocoanut oil will be recognised if we bear in mind that fats constitute our sheet anchor in the treatment of diabetes.

The cocoanut meal may be given in a variety of ways to the diabetic. I have tried *chapatis*, cakes and several other preparations of cocoanut. Cocoanut finely powdered with the addition of a little *besan* and butter, will make fine *chapatis* which will keep also for some time.

Of all the different dietetic cures proposed for diabetes, I am of opinion that the cocoanut is by far the best in every respect. I urge on the medical profession of this country where cocoanut can be had in abundance and where unfortunately diabetes causes a large mortality every year to try the cocoanut cure. If there is any truth in the assertion "that every country spontaneously furnishes remedies for those maladies which the people of the soil are naturally subject to," then the cocoanut, which grows and thrives luxuriantly along the sea-coast of India—the locality which furnishes more cases of diabetes than other parts of the country—should constitute the dietetic cure of diabetes.

Leguminous alimentation in diabetes.

Bovet* has shown the usefulness of leguminous food in many diseases of nutrition and he considers it also suitable and valuable in diabetes. Leguminous seeds are rich in nitrogen and hence useful to give tone to the system.

Soy-bean in diabetes.

The Japanese use very extensively *Soya hispida* or soy-bean as an article of diet. A meal of this as it contains a small amount of carbo-hydrates is used in the form of bread for diabetics. Although soy-bean is also indigenous, it is not largely used as an article of food in India as it is in Japan.

The use of Peanuts.

Ground nut is extensively cultivated in many parts of India. But it is not so largely used as an article of diet as it deserves to be. This may be put to the same use as the Japanese soy-bean in the dietary of diabetics. Dr. J. Walter Leather gives the following chemical composition of its kernels :—

Moisture	4·70	p. c.
Oil	49·25	„
Albuminoids	29·09	„
Soluble carbo-hydrates	13·21	„
Woody fibre	1·65	„
Soluble mineral matter	2·15	„
Sand and Silica	·05	„
Total Nitrogen ...	4·65	„

---

* *Presse Med.*, May 11th, 1895, and also B. M. J. Epitome for 10th August 1895, p. 24.

From the large percentage of oil that it contains ground nut forms an useful article of diet for diabetics. Its meal may be made into cakes, or *chapatis* and given to diabetics.*

Peanut butter made by grinding the nut very fine and reducing the mass to a pasty substance and adding salt for flavouring is an useful article of diet.

The use of dâls.

Several varieties of leguminous seeds known as *dâls* are used as staple articles of food by Indians.

---

* "The peanut, although a very useful article of diet, is rather difficult of assimilation by the system, until it has been digested. To aid in this process the peanut is first cooked, then digested by a chemical process similar to, but slower and more thorough than, that which goes on in the stomach of the human or other animal.

"The next step is to segregate the digestible from the non-digestible portions. The digestive agents employed are peptinzyme, pancreatin, diastase, hydrochloric acid and others. The excess of hydrochloric acid is removed by the use of sodium carbonate, which tends to saponify the indigestible fats and forms with hydrochloric acid common salt, which goes to the bottom, while the soapy substance, which is insoluble, rises to the top and easily skimmed, may be removed by means of a centrifugal machine.

"Now we have the goober juice ready for incorporation into the elixir. This juice of itself is very sweet, like a syrup, and in order to be rendered palatable, requires only to be combined wih 'tasty, palatable aromatics.

"Aside from the juice obtained by the digestive process above described, there is also obtained (in this latter case from the roasted peanut) an extract of high medicinal value. Together with these extracts from the peanut, and the flavours mentioned, is incorporated animal nuclein. This latter agent is a most important addition to the compound, as it assists in digestion, and is an active builder of tissue, the great work of maintaining life."—(Scientific American Supplement No. 1431 of 6th June 1903).

The meal of gram and several other kinds of *dâls* may be put with advantage to the same use in the treatment of diabetics as is done with the meal of soy-bean in Japan. The meal known as *besan* in the Bazars of Northern India may be used in a large variety of ways in the treatment of diabetics. *Chapati* or bread made of *besan* is well relished by, and beneficial to, the diabetic patients.

In the Panjab, chapatis of *besan* mixed with a certain amount of wheaten flour are prepared and largely used by the people. These are called *missirotis.* These may be used with advantage by diabetics.

Unfortunately *besan* is not very largely used in Bengal, where more cases of diabetics are to be met with than in any other province of India.

In the cookery of vegetarian Indians, *besan* serves the same purpose as the yolk of an egg does in European cookery. It is mixed with water and made into a paste and is used to form a sort of coating upon many fruits, tubers, and green vegetables which protects them from too much singeing or getting overbrown.

Very wholesome and palatable cakes are also made of *besan.* It is well beaten and after being a little fermented, small balls of it are made of the size of filberts. The more the paste is beaten and allowed to be fermented, the lighter and more porous becomes the ball which is used after being fried in *ghee* or oil.

Drawbacks to the use of Dals.

Dr. Pavy writes :—

> "As a drawback to their high nutritive value the leguminous seeds must be ranked as difficult of digestion. They require prolonged boiling to render them tender and digestible. They are apt, besides being heavy on the stomach, to occasion flatulence and colic, and the flatus is charged with a considerable quantity of sulphuretted hydrogen, arising from the sulphur which the legumine contains."

Pulses are the staple articles of diet of many races and communities inhabiting India and so they know how to counteract their drawbacks. They cook *dâls* with *Pâpad-khâr* (an impure carbonate of soda) which greatly aids in the process of digestion. In a paper on "The proper cooking of Dâls" which I contributed to the *Indian Medical Gazette* for December 1896, I tried to show how the addition of *Pâpad-khâr* proves useful in the cooking of *dâls*.

The use of oleaginous seeds in Diabetes.

Besides nuts several oleaginous seeds are useful in Diabetes. In this disease as the skin is often dry and harsh, so the administration of seeds which are rich in oil proves beneficial ;—on the same principle on which oil-seed cakes are given to cattle and horses to improve the gloss of their skin.

The use of Sesame.

Seeds of *Sesamum indicum*, known as sesame, or in vernacular *Til* are very extensively used in a variety of ways, by natives of India as an article of food. Dr. J. W. Leather gives its chemical composition as follows :—

Local description.	Source.	Moisture.	Oil.	Albuminoids.	Soluble Carbo-hydrates.	Woody fire.	Soluble Mineral matter.	Sand and Silica.	Total Nitrogen.	Albuminoid Nitrogen.
"Red" ...	Poona	4·18	49·12	20·37	14·16	2·93	6·65	2·59	3·34	3·26
"Black"	"	4·13	47·60	18·12	18·56	4·14	6·86	·59	3·11	2·90
"White"	"	4·21	51·96	18·06	14·62	4·49	6·28	·38	2·99	2·89
"	Nagar	4·87	48·13	22·50	14·05	4·49	5·59	·37	3·60	...
"Black"	Nadiad	5·42	46·50	25·81	9·06	6·51	6·03	·66	4·13	...
"Red" ...	Nagar	5·37	46·20	21·03	15·87	4·18	6·00	1·35	3·37	...

The grain is very rich in oil and may be used in combination with *besan* or pulses of other kinds.

Til used either baked or parched is a very wholesome food. Husked *til* is parched and ground and made into cakes with *besan*, cheese, cream, a little camphor and cardamoms. The delicate aroma of *til* pervades the cakes, which are wholesome and nutritious.

Ground *til* may be also used by its being mixed with cocoanut water, and *dahi* (curd) to which a little *ghi* is added. This makes a pleasant drink.

The use of Linseed.

Linseed may be used as a bread or a porridge with milk. It makes a lighter bread than pure white flour. The oil may also be applied externally to the skin.

The use of *Chironji*, the seed of *Buchania latifolia.*

Chironji, the seed of the berry known as *pial* in Bengal, is very palatable and nutritious and is very rich in oil. It is used as a substitute for almonds and is eaten roasted with milk.

Regarding the fruit of *Buchania latifolia*, Dr. G. Watt writes :—

> " The *fruit* is eaten by the hill tribes of Central India. Having first pounded them, along with the contained kernels, they dry them in the sun. As required, this is baked into a sort of bread and eaten."—(Dictionary of Economic Products of India, Vol. I, page 545).

Chironji bread as prepared above may be given with advantage to the diabetic, as a substitute for ordinary bread.

Poppy-seeds.

Poppy seeds form a valuable article of food of the natives of India. They are largely employed by confectioners and also in the preparation of curry powders. Parched poppy seed is very wholesome. The seeds are rich in oil, very nutritious and hence useful in diabetes.

Cotton seed as a food for diabetics.

Some of the practitioners of the Greco-Arabic School of Medicine prescribe cotton seed as a food to the diabetic. Dr. J. W. Leather in his analysis of Foodgrains and Fodders (Agricultural Ledger No. 10 of 1901) gives the following analysis of the seed-grain :—

Local description.	Source.	Moisture.	Oil.	Albuminoids.	Soluble Carbo-hydrates.*	Woody Fibre.	Soluble Mineral matter.	Sand and Silica.	Total Nitrogen.	Albuminoid Nitrogen.
...	Poona ...	8·52	18·33	11·74	38·78	17·53	3·92	1·22	2·57	1·87
...	" ...	6·93	14·57	11·34	35·96	25·05	4·47	1·68	2·49	1·81
...	Surat ...	6·83	16·51	12·54	32·54	27·11	4·23	·24	2·86	2·00
Egyptian seed ...	...	6·75	28·40	22·63	21·06	16·71	4·19	·26	3·78	3·63

---

* Regarding soluble carbo-hydrates, Dr. Leather writes :—" This term is applied in England to those component parts of food stuffs which are not separately determined.

" In cereals and pulses it includes principally starch, but in other cases, such as some of the oil seeds, there is but little starch ; its place being taken by such substances as pectin or mucilage."

From the above analysis it will be noticed that the Egyptian seed is the one best suited for the diabetic, since it contains a larger percentage of oil and albuminoids and less amount of soluble carbohydrates than the Indian one.

Cotton seed may be given in a variety of ways, such as fried, parched, roasted, or ground into flour and made into bread. Professor Connell of America considers cotton seed to be the richest of all foodstuffs and breadstuffs. The cotton seed meal contains three times as much digestible protein as the highest grade of wheat flour. Being over-rich in protien, pure cotton seed meal bread would closely resemble cheese; a combination, however, of cotton seed meal with other recognised breadstuffs will prove useful.

Green vegetables in Diabetes.

It is because the green vegetables contain a large quantity of salts that their use is recommended in diabetes. These not only ward off scurvy, but relieve constipation, which is one of the most distressing symptoms in this disorder.[*]

---

[*] Dr. Prout in his work on the Nature and Treatment of Stomach and Renal diseases (5th Edition, 1848) wrote :—"The green matter of plants is in general little acted on by the stomachs of the higher animals ; and hence may, in most cases, safely form a portion of the food of diabetic individuals, as first, I believe, recommended by Dr B. G. Babington ; though on very different principles."

Then in a footnote Dr. Prout added :—" From a careful attention to these points for sometime past, I am persuaded that green vegetables, not only exert a beneficial action in diabetes and other forms of dyspepsia ; but that they can be taken with impunity in almost all cases, provided the patient abstains from drinking while taking them. It is the fluid that is taken with them, that more than anything else, causes acidity and flatulence "

Vegetable and mineral salts in diabetes.

Vegetable and mineral salts are necessary for diabetics. Decoctions of cereals namely, wheat, barley, gram and bran are very useful to them.

Calcium salts have benefited diabetics. This may be given in the form of powdered egg-shells, which I have often tried with advantage.

Citric Acid in diabetes.

Dr. Langdon Brown in his recent work on Physiological Principles in Treatment, writing of diabetes, says :—

> **"Citric Acid should be given up to 29 grammes (5 drachms) a day if necessary, to diminish the break-down of the fats of the body."**

Hence fresh lime or lemon juice may be given with very great advantage to diabetics.

Beverages for the diabetic.

The diabetic is very thirsty and so no restriction should be placed in letting him have his drink of pure water. Tea, coffee, cocoa, may be allowed in moderation, although it would be better if he could do without them, for these substances not only contain purin bodies but often give rise to dyspepsia, nervousness, &c., and thus do harm to diabetics.*

---

* *Lemonade for diabetics.*

The following is said to be useful for assuaging the thirst of diabetics :—

Citric acid	1 gramme.
Glycerine	50 grammes.
Cognac	40 grammes.
Distilled water	500 grammes.

(*Medical Times* quoted in the *Scientific American* Supplement, No. 1376 of 17th May, 1902.)

Alcoholic beverages in diabetes.

Some are in favor of alcoholic beverages in moderation, while others condemn them *in toto*. Gautier writes :—

" Generous wines and even cognac bring a valuable element of calorification. Alcohol facilitates the digestion of the fats, and in certain cases diminishes the glycosuria and azoturia. But beer ought only to be allowed very occasionally to diabetics by reason of its dextrin."

Recently, alcohol has been recommended in minute amounts as a food to diabetics.*

---

* " American Medicine" (1906) believes that alcohol in diabetes is intimately bound up with the food question. Plant physiologists have about concluded that vegetable cells cannot utilize sugar delivered to them in the sap until they have first changed it into alcohol, and there is some evidence that this is also the first step in the oxidation of sugar by animal cells. Should this be true, it would be rational to feed alcohol to diabetics during the period that starches and sugars are withheld, indeed some therapeutists advise it on empiric grounds, or for the symptomatic treatment of the exhaustion. It is unfortunately given in large doses which have narcotic effects, whereas it should be given in minute doses, highly diluted, and very frequently to imitate nature's method of delivering it to the cells in minute amounts all the time. This method has been tried with apparent benefit, and might tide the organism over the period during which it is building up its nervous control over the metabolism of the sugars. It is possibly the only disease in which alchohol can rationally be given as food, now that there is such a reaction against giving it in conditions formerly considered essentially in need of alcohol. It is one way at least of saving the oxidation of proteids at a time when they are needed so badly and likely to be burned up."

Alcohol is said to aid the digestion of fat and therefore recommended as a beverage.

In diabetic Coma also, according to Dr. Hutchison,

> "the combustion of alcohol in the tissues appears to lessen the destruction of proteids which are the source of the acid poisons that produce the coma."

But if alcohol is to be given at all it should be done with great caution. It should be given rather as a medicine than either as a beverage or a food, and for this purpose it may be prescribed in the form of a medicated wine, such as the one containing cocaine which has been found useful in diabetes.

Examples of the Diabetic dietary.

Dr. Gautier gives an example of the diabetic dietary. He writes:—

"I will now give as an example (it may be varied very much) the calculation of a normal diabetic diet. Here is an average patient who loses each day with an ordinary mixed diet propor-

---

So also Benedict and Torok (Zeits. f. Kl. Med.) as a result of clinical experiments, conclude that in many severe cases of diabetes alcohol is of great value, lessening the proteid combustion and diminishing the amounts of "acetone bodies" produced. They recommend its careful prescribing in amounts ranging from one to three ounces daily, noting carefully the effects and controlling the amount used. As contra-indications they mention albuminuria, neuritis, arterioscleroses, also the diabetes of children. (J. T. H.)

tional to his weight, 42 grms. of total urinary introgen, corresponding to 206 grms. of dry albuminoids. This subject weighs 70 kgs. and consumes about 3,000 to 3,200 calories per twenty-four hours (an average figure for these invalids). The following alimentation will meet perfectly these losses and needs :—

Foods.	Quantities.	Containing :		
		Albuminoids.	Fats.	Carbohydrates.
	grms.	grms.	grms.	grms.
Beef or mutton (bone not included)	900	180	40·8	3·2
Gluten bread ...	70	35	...	10·3
Green vegetables ...	300	16	27·	15·0
Potatoes ...	60	0·8	0·07	12
Fish	150	23	2·1	...
Cream	100	3·7	22·7	4·2
Butter and fats ...	100	1·0	8·5	0·7
Cheese	60	19	17	...
Wine	500 cc or 40 grms. of alcohol.			
		273·5	170·37	45·4
Corresponding calories : For 40 grms. of alcohol (see above) 320 cals.		1,721 cal.	1,600 cal.	186 cal. 320
				506 cal.

Gautier's Diet and Dietetics, p. 456.

The above dietary is not suited for Indian patients, who are mostly vegetarians and teetotlers. For them a dietary somewhat on the following lines will be found useful.

I. *Breakfast.*—As mentioned before (page 22), there is a larger excretion of sugar in the morning hours than at any other time of the day. So for breakfast carbo-hydrates should be given in moderation, if not totally withheld.

Milk, cocoanut cakes and preparations of *besan* may be given for breakfast. Those who live in provinces where cocoa-nut can be had in abundance should take nothing for breakfast except cocoanut and its preparations without sugar. Thus for beverage, they should drink cocoa-nut milk, and eat cocoa-nut meal, either raw, fried, or roasted. Ground-nut meal made into *chapatis* or cakes is also very beneficial.

Almond, pistachio nut and *akhrot* and oleaginous seeds may be also used in the morning hours.

II. The principal meal of the day, which should be at about 2 or 3 P.M., to consist of rice, wheaten or, better still, millet *chapatis*, dâl and vegetable curries. Such fruits as have been mentioned above are to be given to diabetics with their principal meal of the day.

III. For supper—milk and cocoa-nut preparations.

Conclusion.

The fact should be remembered that no case of confirmed diabetes has been so far known to have been cured. The symptoms of the patient should be relieved and his life prolonged. It is, therefore, necessary not to enforce a too rigid diet, which, by producing disgust for food, might make him worse. Every individual case of diabetes mellitus should be treated on its own merits, and the complications also should be attended to.

In the foregoing pages, great stress has been laid on the restriction if not the total withdrawal of meat, alcohol, tea, coffee and cocoa from the dietary of the diabetic. The use of cane sugar should be altogether prohibited. Since every diabetic possesses a certain degree of toleration for carbo-hydrates, these should not be excluded from his diet.

The Dietetic Treatment of Diabetes.

By Major B. D. Basu, I. M. S. (Retd.)

Cloth bound, Gilt letters, Price one rupee and eight annas only.

Second Edition revised and enlarged.

This work will prove of use to the diabetic as well as to the ordinary Medical practitioner. It is written with a view to enlighten the sufferers from diabetes, which unfortunately is a common disease of the educated classes of India to avoid those articles of food and drink which are harmful to them, and give a list of those which may do them good. The get-up of the book is excellent.

The ably-conducted **Medico-Surgical Journal of the Tropics,** in its issue of August, 1909, in reviewing the work writes :—

"It would be well for every practitioner to get a copy of this book. It has all the facts and theories of the latest kind and what is more the practitioner and the patient will find it a perfect *vade mecum.* All that is interesting or useful is to be found in it."

The well-known London Medical weekly, **THE HOSPITAL,** in its issue of Saturday, September 18th, 1909, in reviewing this work, writes :—"An excellent little work, which should prove of decided value to every practitioner. It is written in a thoroughly practical fashion, * *. What it gives is up to date and lucidly stated. Major Basu's little work ought to become a popular one ; at any rate we can thoroughly recommend it to the practitioner who is interested in the subject with which it deals."

Dr. William Osler, M.D., F.R.C.P., F.R.S., &c. **the Regius Professor of Medicine, University of Oxford and the renowned author of the Text-book of Medicine,** which is one of the best on the subject in the English language, writes in his letter, dated Sept. 21st, 1909, to the Assistant Manager, Panini Office :—"I have looked over Major Basu's little book on the treatment of diabetes, which contains an excellent summary of our present knowledge of diabetic treatment. * *"

The Personal Assistant to the Surgeon-General with the Government of Madras. in his letter of the 9th September, 1909, writes to the Assistant Manager, Panini Office :—" I have the honour to acknowledge the receipt of the book 'The Dietetic Treatment of Diabetes' by Major B. D. Basu, I.M.S. (Retd.), and to state that the Surgeon-General has been pleased to recommend the book for use in the Medical Libraries of the Districts in this Presidency".

The Indian Medical Record of October, 1909, in reviewing the book, writes :—" This is an excellent treatise worth careful perusal. It contains the cream, so to speak, of the current opinions of the leading physicians of the day. * * * * * Not only 'the General Public' and 'the Medical Student' for whom the book is meant, but even experienced practitioners will find in it much to learn and to be benefited by.

The General Practitioner, which is the official journal of the Incorporated Medical Practitioners' Association of the United Kingdom, in its issue, dated London, October 2, 1909, in reviewing the work, writes :—" The author of this neat little book says that the object in view of which he wrote this book was to render people familiar with what to eat and drink in diabetes, and that it has been written as much for the general public as for the ordinary medical practitioner. Dr. Basu's booklet on the Dietetic Treatment of Diabetes admirably fulfils the object of the author. The reader will find a concise account of the various carbo-hydrates most useful for individual cases, and the practitioner will gain a clear idea of the quantity and quality of carbo-hydrate which can be allowed with benefit to a glycosuric patient."

In reviewing this work, the **Prescriber** of Edinburgh, in its issue of November, 1909, writes :—" The book should prove useful in India, where diabetes is a very common disease, claiming many victims among the better class of natives."

THE SACRED BOOKS OF THE HINDUS.

Professor MaxMuller rendered an important service to the cause of comparative theology by the publication of the "Sacred Books of the East." The 49 volumes in that series represent the most important scriptures of the principal nations of Asia. Of these, 21 are translations of the Sanskrit works. But still some of the most important sacred books of the Hindus have not been published in that series.

It is the duty of every faithful and true votary of Hinduism to do all in his power to make known the contents of his sacred books to the world at large and to his fellow brethren in faith in India. It is not too much to say that a very large number of English educated Hindus, unacquainted with Sanskrit, possess very little knowledge of their sacred scriptures. So, while the Christian and the Mahomedan are well acquainted with their religious scriptures, the Hindu alone is ignorant of his sacred books.

To remove this want, it is proposed to publish the original texts of the sacred books together with their English translations. A list of the works already taken in hand is given below. One part of 100 pages or so much as will complete a book or a chapter is published every month.

The subscription rate for those who subscribe to the complete series is one rupee per 100 pages, royal octavo. They will get 1,200 pages in a year for which they will have to pay Rs. 12, exclusive of postage.

The purchasers of separate parts or volumes will get it at the rate Rs. 1-8 per part of 100 pages.

All communications to be addressed to—

THE MANAGER, PANINI OFFICE,
BHUVANEŚVARI ÂŚRAMA,
Bahadurganj, ALLAHABAD.

WORKS ALREADY PUBLISHED

Vol. I. The Upaniṣads : Part I, *viz.*, Isa Kena, Katha, Praśna, Muṇdaka and Mâṇduka with Madhva Bhâṣya, word meaning and English translation. Cloth, Silver letters. Price Rs. 5.

Vol. II. Part 1. Yajnavalkya Smriti, with the commentary Mitaksara and Gloss Balambhatti with English translation. Price 1 Re. 8 as.

Vol. III. Parts 1 & 2. Chhandogya Upanisad with Madhva Bhâṣya word meaning and English translation. Price Rs. 3.

WORKS UNDER PREPARATION.

I.—THE UPANISADS.

(2) Brihadaranyaka, a study by Babu Purnendu Narain Sinha, M.A., B. L.

(3) Bṛihadaranyaka, with the Vârtika of Suresvarâcharya, by Pandit Mahadeva Sâṣtri, B. A., M.R.A.S., Curator, Government Oriental Library, Mysore.

(4) Taittirîya Upaniṣad with Madhva Bhâṣya, by Pandit Chhote Lal Bhârgava, B.A.

II. SIX SCHOOLS OF HINDU PHILOSOPHY.

(1) The Vedânta Sûtras, in ten volumes, (*a*) Śankarâ's commentary with the gloss Bhâmati, (*b*) Râmânuja's commentary, (*c*) Madhva's commentary (Pûrṇaprajña-Darśana), by Mr. Subba Rao, M. A. (*d*) Vijñâna Bhikṣu's commentary (Vijñanâmrita), (*e*) Vallabhâchârya's commentary (Anubhâṣya), (*f*) Baladeva's commentary (Govinda-Bhâṣya), (*g*) Srîkaṇṭha's commentary (Saiva-bhâṣya), (*h*) Nimbârka's commentary (Vedânta-pârijâta-saurabha, with the gloss of Keṣava Kâṣmiri Bhaṭṭachârya), (*i*) Bhâskara's commentary, (*j*) and a new commentary by Babu Srîsa Chandra Vasu.

(2) Pûrva Mimâmsâ, with a new commentary in English, by Professor Gangâ Nâth Jhâ, M.A.

(3) Nyâya, with a new commentary by Mahamahopâdhyâya Professor Satish Chandra Vidyabhushan, M. A., Ph. D.

(4) Sâṅkhya, by Principal P. T. Srinivasa Iyenger, M.A.

(5) Yoga, by Mr. Râm Prasâd, M.A.

(6 Vaiśeṣika, by Babu Nanda Lal Sinha, M.A., B.L.

(7) Sândilya, and (8) Nârada Bhakti Sûtras, by Babu Manmatha Nath Pal, B.A., B.L.

III.—THE SMRITIS.

Yâjñavalkya Smṛiti, with the commentary Mitâkshara and the gloss Bâlambhatti, translated by Babu Srisa Chandra Vasu.

IV.—THE VEDANGAS.

(1) Vyâkaraṇa, (2) Sikshâ, (3) Chhandas, (4) Kalpa, by Babu Srisa Chandra Vasu, (5) Nirukta, or Yâska's comments on Nighantu with critical notes and translation into English by Pandit Hiranand Sastri, M.A., M.O.L. (Punj.); M. R. A. S. (Lond.) (6) Jyotisha, by Professor Nalinbihâri Mitra, M.A.

V.—THE PURANAS.

(1) Vâyu Purâṇa with critical and historical notes and translation into English, by Babu Bijaya Chandra Mazumdar, B.A., B.L., M.R.A.S. (Lond.), (2) Devi Bhâgavata, by Professor Nalinbehâri Mitra, M.A. (3) Adhyatma Râmayâṇa, by Pandit Srikriṣṇa Joshi.

VI.—THE UPA-VEDAS

(1) Suśruta, by Major B. D. Basu, I. M. S.

(2) Silpa-Sastra, by Dr. A. K. Coomâraswâmy, D. Sc. (Lond.)

The Siddhanta Kaumudi

Or Pâninî's Grammatical Aphorisims as arranged & explained

By BHATTOJI DÎKṢITA

Sanskrit Text and English Translation

By SRISA CHANDRA VASU AND VAMANA DASA VASU

Completed in three Volumes in 2,400 pages Royal 8vo.

CONTENTS.

VOLUME I—Nouns and Substantives, pages 1028.
Do. II—Part I. Verbs and their Conjugation, pages 713.
Do. II— „ II. Kridanta or making of nouns from roots, pp. 408.
Do. III—Vaidika Grammar, pages 247.

It contains 4,000 Sûtras of Pâṇinî, 900 Sutras of Sâkatâyana (Uṇâdi), 200 Sûtras on accent (Phit Sûtras), 2,000 verbal roots and their conjugation incorporating the whole of the Mâdhaviya Dhâtuvritti with copious explanatory extracts from Kâsika, Mahâbhâṣya, Tattvabodhini, Manoramâ, &c., &c.

Indian rate, exclusive of postage, Rs. 45.
Foreign rate, exclusive of postage, £ 3.

N. B.—Upto 31st December, 1909 the book will be sold for 30 Rs.

" This is a standard work on Sanskrit grammar, and Sanskrit scholars spend at least a dozen years in mastering its intricacies. * * * It may be mentioned that the Oriental Translation Fund of England advertised about three quarters of a century ago as under preparation the English translation of the Siddhanta Kaumudi by Professor Horace Hayman Wilson. But perhaps he found the work too laborious for him, for the advertised translation was never published."—(*The Indian Mirror, The Hindoo and the Indian People*).

Index to the Sûtras of Panini, Dhâtupâtha, Unadi and Phit Sutras.

Price one rupee and eight annas only.

THE AṢṬÂDHYÂYÎ OF PÂṆINÎ

Complete in 1,682 pages, Royal Octavo:

Containing Sanskrit Sûtras and Vrittis with notes and Explanations in English, based on the celebrated Commentary called the Kás'ika.

PRICE FOR THE COMPLETE WORK.

Indian ...	...	... **Rs.**	**45**	**0**	**0**
Foreign ...	...	... **£**	**3**	**0**	**0**

The Right Hon'ble F. MaxMuller, Oxford, 9th February, 1892. "* * * From what I have seen of it, it will be a very useful work. What should I have given for such a work forty years ago when I puzzled my head over Pâninî Sutras and the Commentaries. * * I hope you may succeed in finishing your work."

The Right Hon'ble F. MaxMuller, Oxford, 30th April, 1899.— "* * Allow me to congratulate you on your successful termination of Pâninî's Grammar. It was a great undertaking, and you have done your part of the work most admirably. I say once more what should I have given for such an edition of Pâninî when I was young, and how much time would it have saved me and others. Whatever people may say no one knows Sanskrit, who does not know Pâninî."

FOLK-TALES OF HINDUSTAN

BY

SHAIKH CHILLI.

REPRINTED FROM THE MODERN REVIEW.

REGARDING THESE ALES

The REVIEW OF REVIEWS of London for October, 1907, wrote :—

"The *Modern Review* contains month by month stories of a type that recall the delightful romances of the Arabian Nights. In the September number Shaikh Chilli tells the story of Prince Mahbub which vies with the stories of Princess Scheherzadi."

THE DAILY PRACTICE OF THE HINDUS.

Contains the morning and mid-day duties. 2nd Edition—revised and enlarged.

Price Re. 1-4.

In reviewing this work, **The Theosophy in India**, for August 1909, wrote :—

"To a Hindu the book should be more than welcome, containing as it does many a rational explanation of the ceremonies enjoined upon him by Mann and His successors. * * In the whole book nothing can surpass the lucidity which the author gives to the true meaning of the Gâyatri, the master mantra of the Hindu."

The Private Journal of the Marquess of Hastings,

A VERY INTERESTING WORK

Paper cover Rs. 2 : Cloth Rs. 3 Postage extra.

The English Works of Raja Ram Mohan Roy.—With an English translation of Tuhfatul Muwahhiddin (His Arabic-Persian pamphlet.) This edition also contains some additional letters, an introduction and 4 illustrations. Cr. 8vo., pages 1008 Cloth. Gilt-lettered. *Price Rs. 5. Postage extra.*

WELLCOME
LIBRARY
INSTITUTE